Subject: MSD Colloquium, Jaeger, Thurs, 10/18, 11am, 212, A-157
From: Suzanne Kokosz <kokosz@anl.gov>
Date: Mon, 01 Oct 2007 15:11:07 -0500
To: Materials Science Division <msd@anl.gov>

MATERIALS SCIENCE COLLOQUIUM

SPEAKER: PROFESSOR HEINRICH JAEGER
University of Chicago

TITLE: [3]Dried to Order: Electronic and Mechanical Properties of Self-Assembled Nanoparticle Monolayers[2]

DATE: Thursday, October 18, 2007

TIME: 11:00 a.m.

PLACE: Building 212, Room A-157

HOST: Igor Beloborodov

Refreshments will be available at 10:45 a.m.

Abstract:

Close-packed nanoparticles form a new class of solids with unique behavior that arises from the interplay of nanoscale confinement and tunable coupling. I will discuss experiments performed on the ultrathin limit of such solids, a single layer of close-packed metal nanoparticles that are separated by short spacer molecules. It turns out that such layers can be self-assembled with very high degree of structural order by a simple drying mechanism. With inter-particle spacings of 1-2nm, electrons can tunnel across these layers and the resulting nonlinear current-voltage characteristics reflect strong Coulomb blockade effects. Surprisingly, the short molecular spacers also provide for tensile strength and the layers can be draped over holes, forming flexible membranes of remarkable resilience.